

I claim:

1. A diagnostic method for a technical installation for determining a cause of a fault event described by a fault state variable, the method which comprises:

establishing an operating state of the installation defined by state variables, by determining diagnostic parameters each characterizing one of the state variables;

compiling a dependency tree containing at least some of the diagnostic parameters by configuring the dependency tree with the following hierarchical levels numbered  $H_n$ , where  $n = 1, 2, \dots$ :

a first hierarchical level containing a fault diagnostic parameter characterizing a fault state variable,

a second hierarchical level, following the first hierarchical level, and containing diagnostic parameters defining state variables acting directly on the fault state variable,

a hierarchical level  $H_{n+1}$ , following a given hierarchical level  $H_n$ , and containing diagnostic parameters defining state variables acting directly on the state variables characterized by the diagnostic parameters at the given hierarchical level  $H_n$ ;

determining a fault path in the dependency tree starting from the fault diagnostic parameter, by identifying a responsible diagnostic parameter at the hierarchical level  $H_{n+1}$  depending on one of a magnitude and a change direction of a diagnostic parameter at the given hierarchical level  $H_n$ ; and

inferring a cause of the fault from the responsible diagnostic parameter identified in the identifying step at a last one of the hierarchical levels.

2. The diagnostic method according to claim 1, which further comprises allocating one of a rising, a falling and a constant change direction to each diagnostic parameter at the hierarchical level  $H_{n+1}$ , for each diagnostic parameter at the given hierarchical level  $H_n$ , as a function of a predefined change direction of the respective diagnostic parameter at the given hierarchical level  $H_n$ , and establishing the fault path by agreement between measured change directions of the diagnostic parameters and the allocated change directions.

3. The diagnostic method according to claim 1, wherein the technical installation is a turbine installation.

4. The diagnostic method according to claim 3, wherein the turbine installation is a gas turbine installation.

5. The diagnostic method according to claim 3, wherein the turbine installation is a steam turbine installation.

6. The diagnostic method according to claim 3, wherein the turbine installation is a combined gas and steam turbine installation.

7. The diagnostic method according to claim 1, which further comprises establishing the cause by utilizing a wide area network.

8. The diagnostic method according to claim 1, which further comprises establishing the cause by utilizing the Internet.

9. A diagnostic system for a technical installation for determining a cause of a fault event described by a fault state variable, the diagnostic system configured to:

establish an operating state of the installation defined by state variables, by determining diagnostic parameters each characterizing one of the state variables;

compile a dependency tree containing at least some of the diagnostic parameters by configuring the dependency tree with the following hierarchical levels numbered  $H_n$ , where  $n = 1, 2, \dots$ :

a first hierarchical level containing a fault diagnostic parameter characterizing a fault state variable,

a second hierarchical level, following the first hierarchical level, and containing diagnostic parameters defining state variables acting directly on the fault state variable,

a hierarchical level  $H_{n+1}$ , following a given hierarchical level  $H_n$ , and containing diagnostic parameters defining state variables acting directly on the state variables characterized by the diagnostic parameters at the given hierarchical level  $H_n$ ;

establish a fault path in the dependency tree starting from the fault diagnostic parameter, by identifying a responsible diagnostic parameter at the hierarchical level  $H_{n+1}$  depending on one of a magnitude and a change direction of a diagnostic parameter at the given hierarchical level  $H_n$ ; and

determine a cause of the fault from the responsible diagnostic parameter identified in the identifying step at a last one of the hierarchical levels.

10. A diagnostic system for a technical installation for determining a cause of a fault event described by a fault state variable, the diagnostic system comprising:

means for establishing an operating state of the installation defined by state variables, by determining diagnostic parameters each characterizing one of the state variables;

means for compiling a dependency tree containing at least some of the diagnostic parameters by configuring the dependency tree with the following hierarchical levels numbered  $H_n$ , where  $n = 1, 2, \dots$ :

a first hierarchical level containing a fault diagnostic parameter characterizing a fault state variable,

a second hierarchical level, following the first hierarchical level, and containing diagnostic parameters defining state variables acting directly on the fault state variable,

a hierarchical level  $H_{n+1}$ , following a given hierarchical level  $H_n$ , and containing diagnostic parameters defining state variables acting directly on the state variables characterized by the diagnostic parameters at the given hierarchical level  $H_n$ ;

means for establishing a fault path in the dependency tree starting from the fault diagnostic parameter, by identifying a responsible diagnostic parameter at the hierarchical level  $H_{n+1}$  depending on one of a magnitude and a change direction of a diagnostic parameter at the given hierarchical level  $H_n$ ; and

means for determining a cause of the fault from the responsible diagnostic parameter identified in the identifying step at a last one of the hierarchical levels.

EPO Patent Application No. 9930499